

Weighing up policy tools

Nature Sustainability welcomes research comparing the performance of environmental policy instruments to better inform the choice of policies and ultimately help to bridge the science–policy gap.

Carbon taxes, payments for ecosystem services, prompts to save energy... the instruments available for environmental policy are diverse. This toolset includes regulations and standards, fiscal or market-based instruments (such as taxes, subsidies and tradable permits), legal liability, voluntary measures and information campaigns, among others. All these can be used to address a range of sustainability problems, from waste management to wildlife conservation. Crucially, there is no silver bullet, so recommending a specific tool above another needs robust evidence about its likely impacts.

Environmental impact evaluation and related fields aim to examine the performance of policy instruments. For example, to understand whether subsidizing electric vehicles is cost-efficient, reduces environmental impact or increases transport equality, to name some possible performance criteria. The bulk of this literature analyses the impact of single instruments in specific contexts, such as how a tax mitigates pollution, or whether protecting a primary forest does reduce degradation. Without this kind of evidence, environmental policymaking is more prone to bias.

Focusing on the impacts of a specific instrument allows experts to assess whether it is (or could be) effective. But it does not inform whether an instrument is better than others to meet a set goal. In theory, this assessment is preceded by considering alternative instruments. For example, if the goal is to conserve an ecosystem, should the instrument be to establish a protected area? Provide incentives for local communities to reduce pressure on land? Or an outright ban on environmentally damaging land-use practices?

In reality, setting the goals can be easier than agreeing on the instrument. Once the goal is decided—for example, increasing water efficiency at a municipality—what is the most effective way to achieve it? An awareness-raising campaign, or subsidizing water-saving gadgets? What should a practitioner consider, given context, recipients and the resources available for policy? Comparative research can inform the choice among instruments to achieve sustainability and the SDGs, and an



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interview with Åsa Persson in this issue highlights critical knowledge gaps and challenges in this domain.

Comparative studies of policy instruments can be facilitated by means of policy databases, like the [one](#) compiled by Kanter and colleagues on nitrogen policies, by reviewing the literature about the tools implemented in specific contexts, such as in the case of [marine protection](#) and [litter](#), or through direct simulations or experiments to [explore the outcomes](#) of several, credible policies. These studies are sometimes playfully framed as contests¹. Regardless of the term, a structured synthesis comparing policy instruments to help practitioners select, like Peñasco and colleagues did for decarbonization approaches², can go a long way to build a bridge between science and policy.

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A further complication arises when two or more instruments are combined; what the disciplinary jargon calls instrument mixes or policy layering. Are concurrent policies more impactful than the sum of their individual performances? Do they have negative interactions? Without adequate evidence of the synergies and trade-offs among instruments, combining them in practice becomes an art.

The paucity of studies comparing environmental policy instruments is understandable; evaluating the performance of a single tool is complicated, let alone

analysing several simultaneously and in a way that allows comparing them. Typically, comparisons are made by means of monetary valuations (cost–benefit analyses), but these approaches have shortcomings in certain situations. They cannot fully capture the complexity of social–ecological interactions, nor can they translate all environmental values and damages. More comprehensive approaches evaluate policy instruments against several criteria, but these also pose dilemmas if some of these criteria are not comparable or compensable. Let us consider the case of a tool designed to protect biodiversity. Naturally, experts would want to evaluate its potential effectiveness at doing so. But what if the same tool suffered from low public acceptance? It would probably be less feasible than others. Should experts recommend another, less effective but more acceptable tool? How much loss in the effectiveness of protection can they compromise in favour of public sentiment? This kind of indeterminacy when evaluating policies based on multiple criteria is uncomfortable to investigate. Further, the role of context and culture, meaning that an instrument can have different impacts depending on the target population, adds to the challenge.

But the challenge needs takers. To address wicked sustainability problems, the science–policy gap needs confronting upfront, no matter the substantial effort needed to orchestrate sciences. This gap could be bridged by combining economic evaluation with the comparative analysis tradition in political science³, or the in-depth knowledge about the variety of responses from humans’ and places’ diversity, as studied by psychologists and geographers, respectively. These are just some examples of the innovative research efforts needed to weigh up different solutions to sustainability challenges. At *Nature Sustainability* we welcome such efforts. □

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